

## SEVERE LOCAL STORMS

[Compiled by MARY O. SOUDER from reports submitted by Weather Bureau officials]

[The table herewith contains such data as has been received concerning severe local storms that occurred during the month. A revised list of tornadoes will appear in the United States Meteorological Yearbook]

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
Fort Worth, Tex.	1	6-7 p. m.			\$25,000	Straight-line wind.	Buildings and electric service damaged; 2 persons injured.
New Jersey, southwestern quarter of the State.	1			4	1,000,000	Tropical disturbance.	Rainfall measured from 4.50 to 10.52 inches, within 12 hours at most stations. Number of small rivers flooded, breaking several dams. Property damage, mostly to highways and bridges, is estimated at more than \$1,000,000. It is remarkable, however, that no rain fell at the coastal stations of New Jersey from this storm.
Niagara County, N. Y., northern portion.	1		12-3		205,000	Heavy hail.	Property damage, \$5,000; crops loss, \$200,000; path 30 miles long.
Haysville, Kans., vicinity of.	2	6 p. m.		0		Tornado.	This storm struck for a short distance in a wheat field.
Kit Carson, Colo.	3	3 p. m.			5,000	Heavy rain.	Highway washed out; houses flooded.
Montezuma to Cimarron, Kans.	5	3:40-5 p. m.	1-6		4,000	do.	Loss mostly in feed crops; path 20 miles long.
Denver, Colo.	5	6 p. m.			500	Hail and wind.	Damage to greenhouses, \$500; severe loss to crops and gardens. Denver covered with from 2 to 4 inches of hail about the size of marbles.
Moccasin, Ariz.	6				5,000	Heavy rain and wind.	Fields and houses flooded; crops buried more than a foot under the sand.
Brunsville to Oyens, Iowa.	7	11 p. m.	12-4		5,100	Hail, electrical.	About 250 farms affected; greatest damage to late corn. Many windows broken; house damaged by lightning; loss in crops, \$15,000.
Stanton, Nebr., vicinity of.	7				4,000	Thunderstorm.	3 barns burned.
Cheesman, Colo.	9	1 p. m.	1		500	Heavy hail.	Property damaged; loss to crops, \$500. Ground covered with 4 inches of hail.
Hoehne, Colo.	9	P. m.	16		100,000	do.	Loss in beets and other crops.
Kiowa, Colo.	9	do.			1,000	Hail.	Loss to crops.
Lockport, N. Y.	15				10,000	Thunderstorm.	Barn and contents destroyed by lightning.
Arvada, Colo.	20	5 p. m.				Hail.	Heavy loss in flowers, hay, and tomatoes.
Houston, Tex. <sup>1</sup>	21	do.			3,000	Thundersquall.	Damage confined to a narrow mile-long east-and-west strip a few blocks south of the business section; property damaged.
Albuquerque, N. Mex., vicinity of.	21				1,000	Electrical.	Barn and contents destroyed.
New Roads and False River Section, La.	24	4:45 a. m.		1	6,000	Tornado.	Several small homes destroyed and several damaged including a cotton gin and the New Roads Livestock Exchange Bldg. Several persons injured, 1 critically.
Chunky, Miss., vicinity of.	24		100	0	3,000	do.	The first damage occurred about a mile northwest of Chunky when a residence was moved 10 to 12 feet from its foundation with the only person in the house a woman, who was slightly injured when she was blown from the back porch into an adjoining room. A short distance away, a Negro church was blown from its foundation and several tenant houses unroofed. Trees blown down lay in all directions, showing the effect of the rotary motion of the storm. A funnel cloud was not observed, but many persons mentioned the red appearance of the clouds prior to the occurrence of the tornado and all reported the roaring noise similar to the passing of a heavy freight train. Large timbers, pieces of roofing, and other debris seen whirling in the air several hundred feet high. Several persons slightly injured; path 880 yards long.
Lauderdale, Miss.	24		500	1	30,000	do.	At least 9 houses completely demolished and 30 others badly damaged; several persons were injured requiring hospital treatment. About 256 persons cared for by the Red Cross. Trees uprooted and broken lay in all directions. Small casualty list because the storm struck during daylight hours rather than at night. Path 3 miles long.
Chicago, Ill., <sup>2</sup> and vicinity.	25	P. m.			250,000	Wind.	For 18 hours high waves battered the harbors of Jackson, Grant and Burnham Parks; 16 small boats capsized and 36 others were damaged.
Atlantic City, N. J., <sup>3</sup> vicinity of.	25	do.		1		Wind and rain.	Loss in crops; damage to electric and telephone lines and property.
Artec Ruins, N. Mex.	30	4:45-5:05 p. m.	1		3,500	Heavy hail.	Property damage, \$1,500; crop loss, \$2,000.

LATE REPORTS FOR AUGUST 1940<sup>3</sup>

Gridley, Kans., 5 miles south and 2 miles west.	14	P. m.		0	\$6,000	Tornado.	Chief damage to buildings on 2 farms.
Eula, Tex.	17	5 a. m.	100	0	500	do.	Damage to barns and outbuildings.
Munday to Goree, Tex.	27	5-6 p. m.	12		55,000	Heavy hail.	Crop loss, \$50,000; property damage, \$5,000.
Gatesville, Tex.	29	3-3:15 p. m.	13		15,000	do.	Crop loss, \$10,000; property damage, \$5,000.
Paducah, Tex.	29	3-4 p. m.	13-5		15,000	do.	Loss to crops.
Marlin, Tex.	29	3:20-3:55 p. m.	110		5,000	Hail and wind.	Damage to property and utilities.

<sup>1</sup> Miles instead of yards.<sup>2</sup> From press reports.<sup>3</sup> 6-9: Supplementary report on tropical storm of August 1940, in Louisiana. This storm was tabulated on August 6-7, with \$200,000 damage. Later reports gave August 6-9, with estimated damage of \$6,445,000 in Louisiana where 37.50 inches of rain fell in 4 days. A detailed account appears in "Daily and Hourly Precipitation, Supplement No. 1, Precipitation in Louisiana and Adjacent Areas, Storm of August 6-10, 1940," issued by the Hydrological Unit of the Weather Bureau at Fort Worth, Tex.

## SOLAR RADIATION AND SUNSPOT DATA FOR SEPTEMBER 1940

## A PREDICTION OF MONTHLY SUNSPOT NUMBERS THROUGH 1944

By JOHN Q. STEWART and FORREST C. EGGLESTON  
[Princeton University, Princeton, New Jersey, October 1940]In several recent papers<sup>1</sup> a method has been outlined for fitting the curve

$$R = F(r-s)a e^{-b(r-s)}$$

to sunspot numbers, where  $R$  is the Wolf number at time  $r$ , and  $F$ ,  $a$ ,  $b$  are constants throughout a given cycle or outburst. Annual numbers for the remainder of the present cycle were predicted by extrapolating such a fit.<sup>2</sup> More recently we have published our predicted monthly numbers,<sup>3</sup> together with annual numbers predicted by others.

In Tables 1 and 2 our predictions are here reprinted to

<sup>1</sup> J. Q. Stewart and H. A. A. Panofsky, *Ap. J.* 83, 385, 1938. J. Q. Stewart and F. C. Eggleston, *Ap. J.* 91, 72, 1940. Cf. M. Waldmeier, *Astronom. Mitteil.* (Zurich) 153, 105, 1935.<sup>2</sup> J. Q. Stewart and F. C. Eggleston, *Physical Review* 55, 102, 1939.<sup>3</sup> J. Q. Stewart and F. C. Eggleston, *Publ. A. S. P.* in press (Dec. 1940).

bring them to the attention of meteorologists. Our method cannot predict the course of sunspots after the beginning of the next cycle, which may be expected (but uncertainly) in 1944. We question whether any method can at the present time predict in detail spot numbers after the next "outburst" begins.

TABLE 1.—Annual Wolf numbers 1933-44

Year	Observed	Computed	Year	Observed	Computed
1933.5.....	5.7	(7)	1939.5.....	88.8	87
1934.5.....	8.7	(7)	1940.5.....		61
1935.5.....	36.1	(37)	1941.5.....		38
1936.5.....	79.7	(84)	1942.5.....		22
1937.5.....	114.1	(111)	1943.5.....		12
1938.5.....	109.6	(109)	1944.5.....		6

NOTE.—The computed numbers in parentheses, 1933-38, were those used in the fit the computed numbers after January 1, 1939, were predictions by extrapolation.

TABLE 2.—Predicted monthly numbers 1939-44

	1939	1940	1941	1942	1943	1944
January.....	99.8	73.5	48.2	28.9	16.2	8.6
February.....	97.8	71.1	46.2	27.5	15.3	8.1
March.....	95.8	68.9	44.4	26.3	14.6	7.7
April.....	93.8	66.8	42.8	25.2	13.9	7.3
May.....	91.4	64.4	40.9	23.9	13.1	6.8
June.....	89.4	62.3	39.3	22.8	12.5	6.5
July.....	87.2	60.3	37.7	21.8	11.9	6.2
August.....	84.8	58.0	36.0	20.7	11.2	5.8
September.....	82.6	56.0	34.5	19.8	10.7	5.5
October.....	80.4	54.1	33.1	18.9	10.1	5.2
November.....	77.9	51.9	31.6	17.9	9.6	4.9
December.....	75.7	50.1	30.2	17.0	9.1	4.6

NOTE.—All the computed monthly values are for the middle of the month. A random irregularity from the predictions, month by month, is to be expected: The predictions purport to represent the underlying trend.

## POSITIONS, AREAS, AND COUNTS OF SUNSPOTS

[Communicated by Capt. J. F. Hellweg, U. S. Navy (Ret.), Superintendent, U. S. Naval Observatory.] All measurements and spot counts were made at the Naval Observatory from plates taken at the observatories indicated. Difference in longitude is measured from the central meridian, positive toward the west. Latitude is positive toward the north. Areas are corrected for foreshortening and expressed in millionths of Sun's hemisphere. For each day, under longitude, latitude, area of spot or group, and spot count, are included assumed longitude of center of the disk, assumed latitude of center of the disk, total area of spots and groups, and total spot count.

Date	East- ern stand- ard time	Mount Wilson group No.	Heliographic	Area of spot or group	Spot count	Plate qual- ity	Observatory
			Dif- fer- ence in longi- tude	Lon- gi- tude	Lat- i- tude	Dis- tance from cen- ter of disk	
1940							
Sept. 1...	h m		°	°	°	°	
	11 4	6973	-74	115	-4	75	24
		6972	-69	120	-17	73	145
		6971	-48	141	-11	52	48
		6969	-48	141	+12	48	12
		6969	-40	149	+11	40	291
		6968	-38	151	+16	39	145
		6967	-10	179	+15	13	73
		6967	-2	187	+15	8	73
		6965	+6	195	-7	15	776
		6955	+87	276	-7	88	48
			(189)	(+7)		1,490	92
Sept. 2...	11 25	6972	-55	120	-17	60	194
		6971	-34	141	-11	39	121
		6969	-27	148	+10	27	194
		6968	-24	151	+16	26	145
		6967	+3	178	+15	9	48
		6967	+12	187	+15	14	48
		6965	+17	192	-8	23	291
		6965	+26	201	-8	31	582
		6974	+60	235	-7	63	73
			(175)	(+7)		1,696	88

## POSITIONS, AREAS, AND COUNTS OF SUNSPOTS—Con.

Date	East- ern stand- ard time	Mount Wilson group No.	Heliographic	Area of spot or group	Spot count	Plate qual- ity	Observatory
			Dif- fer- ence in longi- tude	Lon- gi- tude	Lat- i- tude	Dis- tance from cen- ter of disk	
1940							
Sept. 3...	h m		°	°	°	°	
	10 56	6972	-41	121	-17	47	194
		6971	-20	142	-11	26	133
		6969	-20	142	+12	21	48
		6969	-13	149	+11	14	145
		6968	-11	151	+16	15	48
		6967	+17	179	+15	20	36
		6967	+26	188	+15	27	24
		6965	+30	192	-7	34	291
		6965	+39	201	-8	42	582
		6974	+73	235	-7	75	12
			(162)	(+7)		1,513	82
Sept. 4...	11 18	6972	-28	121	-17	38	194
		6971	-5	144	-10	18	145
		6969	+2	151	+11	5	121
		6968	+3	152	+16	10	145
		6967	+30	179	+15	31	24
		6965	+44	193	-7	46	194
		6965	+52	201	-7	55	485
			(149)	(+7)		1,308	93
Sept. 5...	10 57	6972	-14	122	-17	29	218
		6972	-7	129	-15	24	48
		6971	+3	139	-10	17	48
		6971	+10	146	-10	20	97
		6969	+11	147	+12	13	24
		6969	+15	151	+11	16	121
		6968	+16	152	+16	19	145
		6975	+46	182	-11	48	73
		6965	+57	193	-7	60	97
		6965	+67	203	-7	69	435
			(136)	(+7)		1,356	73
Sept. 6...	10 50	6977	-78	45	+16	77	6
		6977	-69	54	+14	70	6
		6972	-1	122	-17	24	267
		6971	+23	146	-10	29	145
		6969	+29	152	+10	29	73
		6968	+30	153	+16	32	121
		6975	+57	180	-10	60	12
		6975	+60	183	-12	63	97
		6965	+80	203	-7	80	582
			(123)	(+7)		1,309	55
Sept. 7...	10 48	6977	-56	54	+16	56	73
		6978	-1	109	-13	20	12
		6972	+11	121	-18	27	158
		6972	+17	127	-17	30	48
		6971	+36	146	-10	40	145
		6969	+41	151	+11	41	48
		6968	+43	153	+16	43	97
		6975	+76	186	-12	77	48
			(110)	(+7)		629	72
Sept. 8...	9 4	6977	-49	48	+15	49	73
		6972	+26	123	-17	35	242
		6971	+47	144	-12	50	97
		6969	+53	150	+11	53	24
		6968	+56	153	+16	56	73
			(97)	(+7)		509	80
Sept. 9...	11 27	6979	-88	355	+6	88	48
		6977	-38	45	+14	39	24
		6977	-32	51	+14	33	24
		6972	+31	114	+5	31	6
		6972	+40	123	-17	47	170
		6971	+62	145	-12	65	97
		6968	+70	153	+16	70	48
			(83)	(+7)		417	46
Sept. 10...	12 21	6979	-74	355	+6	74	242
		6977	-18	51	+14	20	145
		6972	-11	58	+5	11	6
		6972	+53	122	-17	59	182
		6971	+76	145	-12	78	6
			(69)	(+7)		581	28
Sept. 11...	12 46	6979	-60	356	+6	60	145
		6977	-4	52	+14	9	121
		6972	+66	122	-16	70	97
			(56)	(+7)		363	18

\*=Not numbered.

VG=very good; G=good; F=fair; P=poor.